PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 03157/PCT-cs	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/EP2004/051573	International filing date *(day/month/year)* 22.07.2004	Priority date *(day/month/year)* 17.09.2003
International Patent Classification (IPC) or national classification and IPC F16L23/036, F16L37/12		
Applicant BORMIOLI, Lorenzo		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
11.07.2005	07.11.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - Gitschiner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Authorized Officer Jankowska, M Telephone No. +49 30 25901-506

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/051573

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

3, 4	as originally filed
1, 2	received on 11.07.2005 with letter of 08.07.2005

Claims, Numbers

1, 2	received on 11.07.2005 with letter of 08.07.2005

Drawings, Sheets

1/3-3/3	as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1,2
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1,2
Industrial applicability (IA)	Yes:	Claims	1,2
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (SEPARATE SHEET)

International application No.
PCT/EP2004/051573

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

D1: DE 28 33 866 A (MANNESMANN AG) 14 February 1980 (1980-02-14)
D2: DE 90 977 C (THE VACUUM BRAKE COMPANY LTD.) 8 April 1897 (1897-04-08)

2 INDEPENDENT CLAIM 1

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT:

2.1 The document D1 discloses (the references in parentheses applying to this document):
a flange (5) for pipes for transport of petrochemical fluids (see claim 1), wherein the flange (5) has a bearing surface (14) for a clamping jaw (6), which has a peripheral portion with a curved surface (see figure 1, where the edge of the flange 5 adjacent to the jaw is shown as curved) in the direction of a support of the jaw.

2.2 Moreover D2 discloses a flange (5) for pipes (see Fig. 1 1), wherein the flange (adjacent to point "B") has a bearing surface for a clamping jaw (A), which has a peripheral portion with a curved surface in the direction of a support (F) of the jaw.

3 DEPENDENT CLAIM 2

Dependent claims 2 does not contain any features which, in combination with the features of claim 1, meet the requirements of the PCT in respect of novelty (Article 33(2) PCT):

The inequality given in claim 2 describes the relation between the applied force

between flange and jaw and the friction force between flange and jaw while opening the jaw. The relation should be true when the flange has a curved portion (as in claim 1). As the form of the peripheral portion of the flange and the jaw disclosed in D1 or D2 is the same as in the claimed invention (so the jaw does not block), it is clear that the inequality of claim 2 is verified as well.

Re Item VIII

Certain observations on the international application

The application does not meet the requirements of Article 6 PCT, because claim 2 is not clear:

The subject-matter of claim 2 for which protection is sought is not clearly defined. The claims attempts to define the subject-matter in terms of the result to be achieved, without providing the technical features necessary for achieving this result.
The skilled person is unable to define the shape of the flange following the inequality of claim 2, as none of its components refer to the geometry of the flange.

"Couplable flange with clamping jaws for the connection of pipes for the transport of petrochemical fluids, gases and liquefied gases".

* * * *

The present invention concerns a couplable flange with clamping jaws for the connection of pipes for the transport of petrochemical fluids, gases and liquefied gases.

The connection between pipes is a rather delicate operation especially in extreme conditions, as for example when one must import or export petrochemical fluids or the like between a ship and a tank located on the firm earth, between two ships in open sea or even between two lengths of pipes that extend above or underwater at a depth of several meters.

Connection systems, made up of centring and coupling devices, must prevent possible losses of transported product, which can be extremely negative at economic level, for the safety of the personnel and of the installations, and highly polluting for marine and terrestrial environment in the vicinities of the installation.

In addition said connection systems must be extremely flexible and comfortable for the operator in the coupling stage and quick and in the uncoupling. This because, especially in open sea, meteorological conditions that influence the state of the sea can worsen even quickly, thus imposing the necessity of quick uncoupling of the pipe connection system, therefore compromising the safety of the transport of petrochemical fluids and gases. In a few moments one must be able to stop the flow of fluid and to uncouple the pipes.

US-A-3558161 describes a pipe connection device which comprises a plurality of jaws opportunely controlled by elastic rods connected with a hydraulic or mechanical type control system. The closing control leads said jaws to "get hold of" the flange of the pipe thus guaranteeing its watertightness.

The surface of the flange on which the jaw rests is normally flat and

perpendicular to the longitudinal axis of the apparatus, so that during the uncoupling stage the moment of the force, caused by the friction between flange and jaw, which resists to the uncoupling increases progressively, in some case, even leading to compromise the same uncoupling, the latter being an absolutely not tolerable possibility in the extreme situations in which said coupling/uncoupling systems must operate.

This is also shown in DE-A-28 33 866.

In mathematical terms, for the uncoupling to occur, the product between the applied force R and its arm "a" (opening moment) must always be always greater than the product between the friction force F_a and its arm "b" (resistant moment). That is:

$$R * a > F_a * b$$

For the jaw to open such inequality must remain as such. It has however been verified that during the opening with flange having flat surface, the arm "a" decreases to the point that said inequality cannot be true any longer, in particular when the geometry of the jaw has been chosen in order as to resist strong loads.

Object of the present invention is to provide a flange conformed in such a way as to determine a jaw-flange connection that eliminates in simple and inexpensive way the aforesaid problem.

According to the invention such object is attained with a flange for pipes for the transport of petrochemical fluids, gases and liquefied gases, that it has a bearing surface for clamping jaw, which has a peripheral portion with a curved surface ~~bevelled~~ in the direction of support of the jaw.

In this way the progressive decrease of the arm "a" during the uncoupling stage is compensated by a variation in the force components that is in favour of the opening of the jaw.

These and other characteristics of the present invention will become evident from the following detailed description of an embodiment thereof that is illustrated as a non limiting example in the enclosed drawings, in which:

CLAIMS

1. Flange (1) for pipes for the transport of petrochemical fluids, gases and liquefied gases, characterised in that it has a bearing surface (11) for clamping jaw (3), which has a peripheral portion (2) ~~bevelled~~ with a curved surface in the direction of support of the jaw (3).

~~2. Flange according to claim 1, characterised in that said peripheral bevelled portion (2) is a curved surface.~~

2. Flange according to claim 1, characterised in that the inequality (R_v * a) + (R_o * b) > (F_{ao} * b) - (F_{av} * a) is always verified, where:

R_v = vertical component of the applied force R;

a = arm of the vertical components of the forces;

R_o = horizontal component of the applied force R;

b = arm of the horizontal components of the forces;

F_{ao} = horizontal component of the friction force F_a;

F_{av} = vertical component of the friction force F_a.